



First Attempts to Explain Interstellar Boundary Explorer Observations

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The Interstellar Boundary Explorer (IBEX) mission has recently completed the first global energetic neutral atom (ENA) maps of the heliosheath. Global models provide critical insight for the interpretation of these unprecedented observations. Simulated ENA maps predict flux magnitudes that are, in some cases, similar to observations, but they also exhibit key differences. Models have explored the influence of the conditions of local interstellar medium (LISM) on ENA maps, but the models make fundamental assumptions about the energy and pitch-angle distributions of the heliosheath protons, and the LISM conditions. The directly observed energy distributions of ENAs by IBEX test the assumed energy distributions used in models, the energy distributions recovered from kinetic simulations and suggest areas where the models may be missing significant physical ingredients. We discuss possible physical mechanisms that could explain the pronounced features observed by IBEX. Thus, through the examination of features observed by IBEX and detailed comparison with global models, we quantitatively explore possible implications of the IBEX observations.